

SOME MEDUSAE (MAINLY SCYPHOMEDUSAE) FROM AUSTRALIAN COASTAL WATERS

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SUMMARY

A review is made of 19 species of Australian jellyfish, classified as follows: Order Coronatae, family Linuchidae, 1 species; Order Serraeostomeae, family Pelagiidae, 1 species, family Cyaneidae, 2 species, family Ulmaridae, 1 species; Order Rhizostomeae, family Cassiopoidae, 1 species, family Cepheidae, 2 species, family Mastigiidae, 3 species, family Lychnorhizidae, 1 species, family Cato-stylidae, 2 species; Order Leptomedusae, family Eirenidae, 3 species; Order Limnomedusae, family Olindiadidae, 2 species. The collection had been submitted from the South Australian Museum, and was a representative collection of macroscopic material submitted in recent years, omitting only the order Cubomedusae; in many cases medical problems had prompted the collection of the material.

In the material studied were seven species which have not previously been recorded from Australian waters, including one new species of the family Olindiadidae, *Goniomemus hamatus* sp. nov., from St. Vincent Gulf, South Australia. Morphologic and taxonomic reviews are made where necessary, and zoogeographic distribution is discussed. Field observations are recorded, including one of an apparent association between the rhizostome *Pseudorhiza hueckeli* Haacke, 1884, and the leptomedusan *Eirene menoui* Kramp, 1953, several of the latter being observed sheltering under the exumbrella of the rhizostome, in St. Vincent Gulf, South Australia.

INTRODUCTION

An interesting collection of Australian medusae was sent to me by Dr. R. V. Southcott, South Australian Museum, Adelaide. It has been a great pleasure to work up this collection, which contains 19 species, seven of which were not previously recorded from Australian waters. The majority of the species are Scyphomedusae (12 species), but there are also five species of Hydromedusae, one of which is a new species of the family Olindiadidae.

Previous Australian records are quoted for each species. Only the most important other references are given; full references up to 1910 may be obtained from A. G. Mayer (1910), and for the following period, up to 1959 or 1960, in P. L. Kramp (1961b).

Some species require morphological and systematic discussion, but most of the Rhizostomeae have been thoroughly treated in numerous papers by the late Dr. G. Stiasny of Leiden.

The localities, where the species were collected, are mentioned in succession from west to east on the southern coasts, northwards along the eastern coasts, and westwards along the coasts from Cape York towards Darwin in the Northern Territory. It is a great pity that we know so very little about the fauna off the coasts of the western half part of the Australian continent. Valuable zoogeographic results might be obtained by comparing the occurrence of

jellyfish and other pelagic animals in all Australian waters with the currents and other hydrographical conditions. It is remarkable that among the species represented in the present collection, nine have an entirely tropical distribution in other regions (*Linuche unguiculata*, *Cyanea buitendijki*, *Cassiopea ndrosia*, *Cephea octostyla*, *Nefrostoma coerulescens*, *Mastigias papua*, *Mastigias ocellatus*, *Acromitoides purpurus*, and the hydromedusa *Helgicirrha danduenstis*), and in Australia these species are restricted to the coasts of Queensland or the Northern Territory. *Phyllorhiza punctata*, which, outside Australia, is known with certainty only from the Gulf of Siam, was taken in several Queensland localities, but some specimens were also found near Fremantle in Western Australia; it was originally described from Port Jackson, New South Wales, by Lendenfeld (1884). Only two species of Rhizostomeae, *Pseudorhiza haeckeli* and *Catostylus mosaicus*, are widely distributed and very common in Australian waters where both seem to be endemic. The three species of Semaostomeae, *Pelagia noctiluca*, *Cyanea capillata* and *Aurelia aurita*, which have an almost world-wide distribution, seem to occur in all Australian waters. The distribution of the three Hydromedusae, *Eirene menoni*, *Phialopsis diegensis* and *Olindias singularis*, is dealt with in the text below.

The collection was accompanied by a detailed list of the localities, in several cases with interesting additional remarks on the colours of the living specimens and their local occurrence and behaviour: I have taken great pleasure in quoting from these remarks, forwarded by Dr. Southcott.

SYSTEMATIC ACCOUNT

CORONATAE

Linuche unguiculata (Swartz, 1788)

Linuche unguiculata Eschscholtz, 1829, p. 91.

Lingeres aquila + *draco* Haeckel, 1880, p. 496.

Previous Australian Records: Mayer, 1915, pp. 160, 174. Torres Strait.

Material Examined: Thursday Island, December, 1961, 9 specimens.

The specimens are 9-11 mm high and 12-15 mm wide.

Pacific specimens of *Linuche* have frequently been referred to a distinct species or variety, *aquila* Haeckel, differing in the arrangement of the wart-like protuberances on the subumbrella, well illustrated by Mayer (1910, p. 560, text fig. 356), the warts being arranged in three circles in the Atlantic form *unguiculata* but in only two in the Pacific *L. aquila*. The validity of this distinction has been doubted by several authors, and I can state that the difference is quite accidental and independent of geographical occurrence.

In the present North Australian specimens the arrangement of the subumbrellar warts is decidedly of the *aquila*-type, but with one exception it is the same in the numerous specimens deposited in the Zoological Museum of Copenhagen and derived from several localities, not merely in tropical Indo-Pacific waters, but also in samples from the western Atlantic. On the other hand, in a sample collected south-east of New Caledonia, thus in a Pacific locality ("Dana" Stn. 3620), three of the specimens (about 24 mm wide) show an approximation towards the *unguiculata*-type. The two outer circles of warts are as in all the other specimens examined by me, but an additional wart is present in the inner (proximal) part of each of the interradial spaces between

the gonads. It is minute in two of the specimens, fairly large in the third one and in all a well-developed wart is also attached to each of the gonads, as generally seen in the *aquila*-type.

I may add that the type specimens of *Linerges draco* Haeckel from the South China Sea, which are in our collection at Copenhagen, are in no way distinguishable from *Linuche unguiculata*, their subumbrellar warts being of the *aquila*-type. The same applies to cotypes of two other Haeckelian forms, *Linerges petasus* and *Liniscus sandalopterus*. We may thus safely state that the genus *Linuche* consists of only one species, *Linuche unguiculata* (Swartz).

Geographical Distribution: Tropical parts of the Indian and Pacific Oceans and the western Atlantic.

SEMAEOSTOMEAE

Pelagia noctiluca (Forskål)

Synonymy: *P. panopyra* Péron and Lesueur, *phosphora* Haeckel a.o.

Previous Australian Records: Haeckel, 1880, p. 509. Lendenfeld, 1887, p. 18. Mayer, 1915, p. 178, Queensland. Stiasny, 1931b, p. 31, Port Jackson. Dakin and Coletax, 1933, p. 198, New South Wales. Ranson, 1945, p. 315, Port Jackson. Kramp, 1961a, p. 204, Green Island, Great Barrier Reef. Pope, 1963, p. 193. Thomas, 1963, p. 208, east Australia.

Material Examined: Off Sydney, New South Wales, at surface, 28.i.60, coll. J. Ræck, 1 specimen, diam. ca. 8 cm. Circular Quay, Port Jackson, New South Wales, 12.v.60, coll. Maritime Services Board of New South Wales, 2 specimens, diam. 4-5.5 cm. Turu Cay, North Queensland, mid-November, 1961, coll. V. Wells, 1 specimen, diam. 3 cm.

Several species of *Pelagia* have been described, but it is now generally agreed that most of them are identical with the widely distributed *P. noctiluca* (Forskål). Specimens from Pacific and Malayan waters have frequently been referred to a separate species, *P. panopyra* (Péron and Lesueur), but studies by Stiasny (1934, 1935 and 1940) and Bigelow (1938) have rendered it highly probable that this form cannot be distinguished from *P. noctiluca*. In a recent paper, F. S. Russell (1964) has found that specimens from the Californian coast, formerly named *P. noctiluca* var. *panopyra* (Fox and Millott, 1954), belong to a separate and valid species, *P. colorata* Russell. Russell also maintains the Indo-Pacific species *P. flaveola* Eschscholtz as a valid species, in agreement with Stiasny (1935), who had examined numerous specimens of this species from Amboina; the species had formerly been observed on only a few occasions. It was well described and figured by Agassiz and Mayer (1902) as *P. tahitiana*. It is mainly characterized by very large and prominent, pointed nematocyst warts on the exumbrella, but it is also emphasized by the authors that the gonads are unusually large even in small specimens.

The specimens from the two localities near Sydney, mentioned above, are typical *P. noctiluca*; their nematocyst warts are numerous, small, round-oval, transversely wrinkled, and evenly distributed over the exumbrella. The specimen from northern Queensland is also *P. noctiluca*, but calls for some comment. Although it is only 30 mm wide, its gonads are remarkably voluminous, protruding very far downwards below the subumbrella, but the eggs are small and immature: the mouth tube is short and broad, the lips indistinct; the exumbrella warts are numerous and they are very small, of exactly the same appearance as in the larger specimens from Sydney. There is no reason, therefore, to presume that it might belong to *P. flaveola*. Moreover, the shape of

the umbrella is rather flattened, not highly vaulted as described in *P. flaveola*, and the colour is light pink, not yellow.

Geographical Distribution: Oceanic in the upper strata of all warm and temperate seas.

Cyanea capillata (L.)

Previous Australian Records: ? *Cyanea rosea* Quoy and Gaimard, 1824, p. 570, pl. 85, figs. 1, 2. Great Barrier Reef. *Cyanea annaskala* v. Lendenfeld, 1882-1887. Port Philip, Victoria; Port Jackson, New South Wales. *Cyanea muellerianthe* Haacke, 1886, p. 605, pl. 36, figs. 1-4. St. Vincent Gulf, South Australia. *Cyanea muellerianthe* Stiasny, 1922, p. 521, south of Cape Howe, Victoria. *Cyanea annaskala* Pope, 1949, p. 14. Sydney. *Cyanea capillata* Pope, 1953b, p. 111. New South Wales. *Cyanea* sp. Barnes, 1960, p. 996. North Australia.

Since the genus *Cyanea* was thoroughly revised by Stiasny and van der Maaden (1943), it is possible to determine the Australian species of this genus with certainty. With one exception (*C. buitendijki*, see below) all the specimens in the present collection belong to the widely distributed *C. capillata*, being very similar to specimens from northern Europe. We can safely state that *C. annaskala* von Lendenfeld and *C. muellerianthe* Haacke are synonyms of *C. capillata*. In all the present specimens the terminal branches of the lappet canals are numerous, densely set and with no or very few anastomoses. *C. rosea* Quoy and Gaimard, which was described from the Great Barrier Reef, is an altogether doubtful species; it may have been *C. capillata* and, at any rate, this was the first record of a *Cyanea* in Australian waters.

Material Examined:

- (1) Coffin Bay, South Australia, 10.iii.1960. Coll. S. A. Shepherd. 2 specimens, diam. 7.5-10.5 cm.
- (2) Port Lincoln, South Australia, about one mile out to sea, at surface. 27.iii.1961. Coll. Miss R. M. Arnott-Rogers. 4 specimens, diam 12, 13, 15, 17 cm (see remarks below).
- (3) Port Lincoln, South Australia, from surface to 20 feet depth, 1.iii.1959. Coll. F. J. Mitchell and T. D. Scott. 2 specimens, diam. 8-10 cm (see remarks below).
- (4) Pondalowie Bay, Yorke Peninsula, South Australia, 18.iv.1960. Coll. F. J. Mitchell. 1 specimen, diam. 14 cm.
- (5) Elwood Beach, Victoria, 2.i.1961. Coll. S. Wiener. 3 specimens, diam. 3, 7, 8.5 cm. (see remarks below).
- (6) Cairns, Queensland, 3.ii.1960. Coll. G. Rowell. 1 specimen, diam. ca. 26 cm. (see remarks below).
- (7) Ellis Beach, Queensland, 18.i.1960. Coll. Fisher (see remarks below).

Remarks:

Re (2), Port Lincoln: 27.iii.1961. "... these medusae were very plentiful. The colour in life is brownish-yellow. The medusae were seen at the surface down to visible depths of 7 to 8 feet. At the time of collection there was a S.E. breeze and a dodge tide. The species causes stings on contact . . . these jellyfish tend to congregate under jetties. Later in the season, that is in April to May, 1961, in quiet weather these jellyfish formed large, thick masses near the surface, these masses forming a mat of hundreds of specimens, and such a mat would be found every mile or so in sailing."

Re (3), Fort Lincoln, 1.ii.59: Mr. Mitchell states that in life these medusae are pinkish-orange, and that even the small ones have tentacles 9 feet (3 metres) long. The tentacles sting, forming a white elevated line or weal on the skin, about 3 mm across, and the resultant pain, itching and swelling lasts about half an hour. They were very abundant in Port Lincoln Harbour . . .

Re (5), Elwood Bay, 2.i.61: Dr. Wiener reports that during this present summer these jellyfish have been plentiful at Elwood Beach. "The tentacles of some specimens were 3-4 feet long. Many jellyfish had no or very short tentacles. . . the tentacles caused pain, itchinness and erythema lasting for a few hours. [The medusae] are purple but the colour soon fades when they are removed from the sea."

Re (6), Cairns, 3.ii.60. Dr. Barnes reports: "Collected near entrance to the shipping channel leading into Cairns Harbour. Similar jellyfish (of variable colouration) [were] very numerous at that time following strong south-east winds . . . Colours before preservation were greyish-white, semi-opaque disc with brown-black lappets; tentacles transparent, almost colourless (bluish); fine subumbrellar filaments dirty string colour."

Re (7), Ellis Beach, 18.i.60. Dr. Barnes reports: "Collected near the rocks at the south end of Ellis Beach before midday on 18.i.60. Similar jellyfish had been numerous in the area during the previous few days. This specimen was stranded on the sandy beach, and subjected to wave damage. Colour before preservation was milky-white with dark chocolate markings on the disc."

It is remarkable how differently the colours of the living jellyfish are described by the various observers; it may partly depend on the size and the state of maturity of the specimens, but similar variations may also be observed in European waters.

As seen from the above, this jellyfish occurs in great numbers along the coasts from South Australia eastwards and northwards to Queensland. There are, unfortunately, no records of its being taken along the northern and western coasts.

Geographical Distribution: Almost cosmopolitan in coastal waters, mainly in arctic and temperate seas, less frequent in tropical regions.

Cyanea buitendijki Stiasny

C. capillata var. *buitendijki* Stiasny, 1919, p. 87, pl. 3, fig. 10.

C. buitendijki Stiasny and van der Maaden, 1943, p. 254, figs. 12, 13.

Material Examined: Darwin, Northern Territory, 9.xii.1958. Coll. L. Hickey. 1 specimen, diam. about 8 cm.

This species belong to the *nozaki*-group (Stiasny and van der Maaden, 1943), being closely related to *Cyanea nozakii* Kishinouye and *C. mjobergi* Stiasny. In contradistinction to the *capillata*-group the *nozaki*-group is characterized by the rhopalar and the tentacular stomach pouches being connected by anastomoses through the gelatinous septa, whereas these septa are uninterrupted in the species of the *capillata*-group, separating the 16 stomach pouches completely from each other. Stiasny and van der Maaden recognize three species of the *nozaki*-group. In *C. nozakii*, which was described from Japan and has also been found in the Mergui Archipelago, near Nhatrang in Vietnam, and near Surabaya in Java, the marginal lappets contain a dense network of anastomosing canals, whereas no anastomoses are seen in the lappets in the two other species. As distinguishing characters between *C. mjobergi*, which was found in north-western Australia, and *C. buitendijki*, which up to now has only been

observed near Amboina in the Banda Sea, the authors emphasize three points: (1) the lateral diverticula from the broad tentacular stomach pouches are irregular, tree-like ("Bäumchenförmigen") in *C. mjoebergi*, straight and undivided in *buitendijki*; in the present specimen they are straight, but their margins are undulating. (2) The horse-shoe-shaped figures marking the insertions of the tentacles are narrower in *buitendijki* (2/1 or 3/1) than in *mjoebergi* (1.5/1), in the present specimen (1.7/1.3). In *mjoebergi* the radial muscular bands reach inwards halfway in between the sections of the circular muscle band, whereas in *buitendijki* the radial muscles are entirely outside the circular muscles; in this respect the present specimen is decidedly of the same type as in *buitendijki*. I do not hesitate therefore, to refer the north Australian specimen to *Cyanea buitendijki* Stiasny, though future examination of a more extensive range of material may possibly disclose a variability, which would make it necessary to unite the two forms.

Further Distribution: Amboina in the Malayan Archipelago, not previously recorded from Australia.

Aurelia aurita (L.)

(Figs. 1-2)

Previous Australian Records: *A. coerulea* Lendenfeld, 1884, p. 280. Port Jackson, New South Wales. Stiasny, 1924c, p. 69, fig. 6. Port Jackson and Port Hacking, near Sydney, New South Wales, Dakin and Colefax, 1933, p. 198.

Material Examined:

- (1) South Australia, ca. June, 1961, no other data available. 1 specimen, diam. 12 cm.
- (2) Creek, Port Price, South Australia, 4.vii.1959. Coll. J. H. Bell. 1 specimen, diam. 13 cm. (see remarks below).
- (3) Port Price, South Australia, 10.vi.1961. Coll. J. H. Bell. 2 specimens, diam. 12-15 cm. (see remarks below).
- (4) Green Island, north Queensland, 18.xii.1958. Coll. W. Costa, per J. H. Barnes. 1 specimen, diam. 5.5 cm (see remarks below).
- (5) Swan River, near Perth, Western Australia, date not given, presumably summer-autumn, 1957-58. Coll. F. Barrett-Lennard. 2 specimens, diam. 9-10 cm. (shrunk).

These specimens of *Aurelia*, and apparently all others from Australian waters, belong to a variety of *Aurelia aurita*, which was first described by Lendenfeld (1884) as *A. coerulea*.

Most of the numerous species of *Aurelia*, which have been described, are local varieties of *A. aurita* (L.); only one or two other species are valid. *A. limbata* (Brandt, 1838) is a distinct species, occurring in the northern Pacific and north-western Atlantic, and it is a bad mistake to identify it with *A. limbata*, as Mayer did (1910, p. 628). All the canals, except the eight adradial, are much and profusely branched, with numerous lateral diverticula forming numerous anastomoses. In the living condition the medusa is conspicuously yellow with a brown margin.

A. solida Browne, 1905, has been recognized as a valid species by several authors. It is mainly characterized by the marginal sense organs pointing upwards towards the exumbrella. The mouth-arms are thin, narrow bands, slightly folded, the canals slender with few anastomoses. Its geographical distribution is very peculiar (tropical Indian Ocean and the warm parts of the eastern

Atlantic), and it seems very probable that it cannot be retained as a valid species or even as a separate variety of *A. aurita*.

The Indo-Pacific *A. labiata* Chamisso and Eysenhardt, 1820, is characterized by the umbrella margin being divided into 16 lobes, each of the eight primary lobes between the rhopalia being divided by a median cleft; the canal system is very similar to that in *A. aurita*. Most authors have considered it as a separate species but future studies may show that it cannot be regarded as specifically distinct from *A. aurita*.

All other forms of *Aurelia* certainly belong to *A. aurita* (L.). The structural differences between them are not very conspicuous and are, moreover, subject to individual variation and dependent on development or contraction. Some characteristic features separating different varieties or races may, however, be pointed out.

Among characters without taxonomic value may be mentioned: (a) colour; (b) thickness of the jelly and degree of vaulting of the umbrella; (c) shape and size of the subgenital pits, which may be changed in different ways during preservation; (d) the ratio of the gonadal to the umbrella diameter is variable within one and the same population, in the present Australian specimens varying between 33/100 and 46/100; (e) much stress has been laid upon the number of canals arising from each genital sinus between adjacent interrhopalar radial canals; this is, however, dependent on the age and developmental stage of the individuals, the genital portico "swallowing up" the basal parts of the canals during its outward growth, so that the number of "canal roots" is gradually increased, frequently amounting to 5 or 7.

Some importance for distinguishing between varieties or races of *A. aurita* may, however, be applied to the following characters:

(i) The mouth-arms; not their length, but the folding of their edges. In var. *maldivensis* (Bigelow), which occurs in the Indian Ocean from the Red Sea to the Malayan Archipelago, the structure of the mouth-arms is particularly complex, being large, curtain-like, their base massive, solid, with complexly folded, meandrine lips surrounding the mouth opening and hanging far down, while their distal parts are thin, slightly folded. In var. *colpota* (Brandt) the arms are broad, much folded and lobed throughout their length, in their basal part very wide, with a deep incision. Mayer (1910) has identified the Australian var. *coerulea* (Lendenfeld) with *colpota*, and Süssny (1924c) likewise considers these two forms as closely related, which is a mistake; in *coerulea* the arms are solid, but their margins are thin, undulating, but not complexly folded, and there are no obvious basal incisions. In North Atlantic specimens of *A. aurita* the mouth-arms are likewise rather simple, their margins not conspicuously lobed but more densely crenulated than in *coerulea*.

(ii) The branching of the canals, whether densely or sparingly branched, and to what extent anastomoses occur. In this regard there is a conspicuous difference between specimens from north-western Europe and the Atlantic coast of North America, which in other respects are very similar to each other; in the distal portions of the canals there are many more anastomoses in American than in European specimens, in the various Indo-Pacific forms anastomoses seem to occur sparsely.

(iii) Formation of adradial notches or incisions in the umbrella margin. Such incisions are particularly conspicuous in *A. labiata*, but they may also be observed in other forms of *Aurelia*, though in greatly varying degree. Bigelow (1913, p. 98) has shown that secondary indentations in the margin of *A. limbata* are simply due to contraction of the umbrella. The present author has seen living *A. limbata* swimming in the sea on the west coast of Greenland, the

margin being eight- or sixteen-lobed in regular succession according to the expansion or contraction of the umbrella but the secondary notches disappeared completely when the specimens were preserved in formalin. To a lesser degree these secondary marginal notches may also appear in *A. aurita*, in European as well as in other populations; they are very inconspicuous and are rarely seen in North Atlantic specimens, but it is interesting to note that they are mentioned in the descriptions of all the Indo-Pacific forms, where they seem to be more inclined to remain after preservation.

On a former occasion (Kramp, 1942, pp. 109 *et seq.*) I have discussed these matters. The populations in northern Europe and on the Atlantic coast of North America are geographically separated and may be termed "geographical races"; but if the determinations and descriptions in the literature are correct, the geographical areas of distribution of the Indo-Pacific forms are apparently more or less overlapping, though the variety *coerulea* seems to be characteristic of Australian waters.

According to the literature, the Australian variety, *coerulea*, differs from the typical north-east Atlantic *A. aurita* mainly in the mouth-arms being broad, plump, and only slightly crenulated, in the rhopalar marginal clefts being comparatively deep and in more or less conspicuous median notches in the eight primary marginal lappets.

Examination of the specimens in the present collection (see Fig. 1) and direct comparison with specimens from Danish waters confirm these statements. The rhopalar clefts are deeper in the Australian than in the Danish specimens. The difference in the mouth-arms is still more conspicuous; in the European specimens the margin of the arms is much more densely crenulated than in the Australian (see Fig. 2); in both forms the edges of the mouth-arms are provided with a row of numerous, minute tentaculæ, which seem to be better developed in the Australian specimens. Median, adradial notches in the eight marginal lappets are clearly seen in the present specimens; they are seen only as fairly slight incurvations but it is remarkable that in all the specimens they have been retained after the preservation of the animals. It is also remarkable that the radiating canals issuing from the genital cavities are rather sparingly branched in their proximal portions, forming elongate furcations; even in the largest specimen observed, 15 cm. wide (Fig. 1), there are only three "canal roots" arising from each genital sinus; in their distal parts the canals are more densely branched, but there are no, or extremely few, anastomoses between them and then, at any rate, only in the immediate neighbourhood of the umbrella margin. The ratio of the gonadal to the umbrella diameter varies between 33/100 and 46/100; in the present state of preservation the genital pits are small and circular.

Remarks on the Occurrence of the Specimens.

Re (2), Port Price, 4.vii.59. Mr. Bell reports the specimen came from between the surface and 10 feet (3 metres) depth; the jellyfish occur in large numbers, pulsating and swimming with the tide.

Re (3), Port Price, 10.vi.61, surface to 20 feet depth. Mr. Bell remarks that this species was abundant, and the jellyfish were very sluggish, making hardly any attempt to swim, and were carried by the current.

Re (4), Green Island, 18.xii.58. "... drifting a few inches under the surface in approximately 100 feet (30 metres) of clear water off Opolu Cay. Bright sunshine, no wind, calm sea, still alive. No other jellyfish seen in vicinity."

Geographical Distribution: *Aurelia aurita* with its varieties has an almost cosmopolitan distribution in coastal waters.

RHIZOSTOMÆAE

Cassiopea ndrosia Agassiz and Mayer, 1899

Previous Australian Records: Stiasny, 1933, pp. 913-922, fig. 1, Hayman Islands, Whitsunday Group, Queensland.

Material Examined: Hope Island, Queensland, no date. Coll. Mrs. Betts. 1 specimen, diam. 4.4 cm. Thursday Island, North Queensland, 10.xii.61, from inside of sunken vessel. Coll. H. W. Cummings. 4 specimens, diam. 2-4 cm.

This species, originally described from the Fiji Islands (by Agassiz and Mayer, 1899), was dealt with in a special paper by Stiasny (1933), who examined two Australian specimens and stated that *C. ndrosia* is different from the West-Indian species, *C. xamachuna* R. P. Bigelow, 1892.

The Australian localities are all on the coasts of Queensland.

Further Distribution: Fiji Islands and New Caledonia.

Cephea octostyla (Forskål)

Cephea octostyla L. Agassiz, 1862, p. 156.

Cephea octostyla Mayer, 1910, p. 652, fig. 405.

Cephea octostyla Stiasny, 1921, p. 73.

Material Examined: Green Island, Cairns, Queensland, 30.xii.59. Coll. Miss Jennifer Barnes. 1 specimen, diam. 3.0 cm.

A young medusa, taken off Rockhampton, Queensland, was, with some doubt, referred to this species by Stiasny (1926, p. 251). According to Stiasny (1921, p. 73) Forskål's *Medusa octostyla* is doubtful and not the same as *Cephea octostyla* L. Agassiz. The species is characterized by the presence of 4 to 12 long, tapering, wart-covered filaments in the middle region of the mouth-arms and cannot be confounded with *C. cephea* (Forskål), which on a former occasion has been recorded from the Great Barrier Reef (Kramp, 1961a, p. 204).

Further Distribution: Red Sea (Forskål), Philippines.

Netrostoma coerulescens Maas, 1903

Netrostoma coerulescens Maas, 1903, p. 35, pl. 5, figs. 37, 46; pl. 11, figs. 97, 103; pl. 12, fig. 109.

Cephea octostyla var. *coerulescens* Mayer, 1910, p. 653.

Netrostoma coerulescens Stiasny, 1921, p. 77, pl. 1, fig. 2; pl. 3, figs. 19, 20, textfigs. 3, 4.

Previous Australian Record: Stiasny, 1931b, p. 36, off Wilson Islet, Capricorn Group, Queensland.

Material Examined: Tongue Reef (north side), 30.i.60, at surface. Coll. T. Purcell. 1 specimen, diam. ca. 10 cm.

There are seven round-edged marginal lappets in each octant; the length of the mouth-arm is 7 cm.

Further Distribution: Widely distributed from the Arabian Sea to the Philippines; Japan.

Mastigias papua (Lesson 1829)

Previous Australian Records: Mayer, 1915, pp. 160, 193, Torres Strait. Stiasny, 1931a, p. 144, North Australia.

Material Examined:

- (1) South Mission Beach, near Tully, north Queensland, 18.xii.60. Coll. J. H. Barnes. 4 specimens, diam. 15-25 mm. (see remarks below).
- (2) Cairns Inlet, 13.xii.61. Coll. W. Monro. 1 specimen, diam. 17 mm.
- (3) Esplanade, Cairns, Queensland, 21.xii.61. Coll. J. Kells, E. Buckler, E. Adams. 1 specimen, diam. 24 mm.
- (4) Pebbly Beach, north Queensland, 9.i.59. Coll. J. Holden, per J. H. Barnes. 1 specimen, diam. 47 mm. (see remarks below).
- (5) Pebbly Beach, north Queensland, 12.i.59. Coll. J. Holden, per J. H. Barnes. 1 specimen, diam. 35 mm. (see remarks below).
- (6) Halfmoon Bay, north Queensland, 25.xii.61. Coll. W. Kay. 1 specimen, diam. 18 mm.
- (7) Embley River, Weipa, Gulf of Carpentaria, Queensland, 6.x.61. Coll. Mrs. Betts. 1 specimen, diam. 25 mm.

This is the common and widely distributed Indo-Pacific species of *Mastigias*, characterized by the eight rhopalar canals being slender, usually communicating with the adjacent parts of the intracircular mesh-work of canals, and by the number of canal-roots in each octant being less than ten, usually seven to eight. All Australian records up to now are from the northern tropical waters.

Remarks on Occurrence and Colours:

Re (1), near Tully, 18.xii.60. "Tide falling, water murky, sea smooth, wind light north-east. Medusae captured in 2 to 3 feet of water 50 yards offshore, over fine sand. All specimens seen were swimming within 6 inches of the surface. Colour before preservation—variable from dark blue in smaller specimens to light brown in the largest. Strongest coloration on umbrella which also consistently showed small circular whitish spots."

Re (4), Pebbly Beach, 9.i.59. "Upper surface of bell olive-green with dark blue spots. On each of the eight mouth-arms there hangs a three-edged finger-like process, which is a dark, mottled purple colour and shaped like a three-bladed propeller in transverse section. Some 'fingers' have been damaged and there appears to have been a process of re-growth."

Re (5), Pebbly Beach, 12.i.59. ". . . Before preservation the upper surface was brown with many small white spots. Eight fleshy creamy-white mouth-arms were present, which bore numerous small white clubs, bright blue at the tip."

It is very interesting to note the different records of the colours in living specimens before preservation; previous records in the literature likewise state that the colours are very variable in this medusa.

Geographical Distribution: Widely distributed in tropical coastal waters in the Malayan Archipelago and western Pacific to the Fiji Islands and Japan.

Mastigias ocellatus (Modoer, 1791)

- Mastigias ocellata* Haeckel, 1880, p. 623.
Versura palmata Haeckel, 1880, p. 606, pl. 40, figs. 9-12.
Mastigias ocellata Mayer, 1910, p. 680.
Mastigias ocellata Stiasny, 1922, p. 530, figs. 4-6.
Mastigias ocellata Stiasny, 1924a, p. 490, figs. 2, 3.
Mastigias ocellatus Kramp, 1961b, p. 358.

Not previously recorded from Australia.

Material Examined: Clifton Beach, near Brisbane, Queensland, 29.xi.61, coll. L. Morrissey, 1 specimen, diam. 26 mm. North Queensland, no other data available, coll. C. Russell, 1962, 1 specimen, diam. 43 mm. Fanny Bay, Darwin, Northern Territory, 10.v.59, coll. C. F. Holman, 1 specimen, diam. 55 mm.

Modern descriptions of this species are given by Stiasny (1922 and 1924a), who also found (1922, p. 538) that the type specimen of "*Versura palmata*", Haeckel, 1880, was identical with *Mastigias ocellatus*.

In contradistinction to *M. papua* the rhopalar radial canals are broad, the four periradial being distinctly bottle-shaped without anastomoses with the intra-circular meshwork of canals; there are many more canal roots, 15-20 in each octant; it is also distinguished by the small terminal appendages on its mouth-arms. Haeckel (1880) gave the number of marginal lappets as 12 per octant, and this is repeated in Mayer (1910) and, unfortunately, also in my "Synopsis" (Kramp, 1961b, p. 358). According to various other authors the number of lappets is 6 or 8 per octant, though Stiasny (1924a) found 6 in some and 12-14 in other octants of one and the same specimen. In the present specimens I have counted 8-10 lappets per octant.

From the time when "*Medusa ocellata*" Modoer was referred to the genus *Cephea* (by Péron and Lesueur, 1809, and L. Agassiz, 1862), the specific name was generally written *ocellata* but the correct spelling must be *ocellatus*.

Mastigias anderseni Stiasny, which has similar, bottle-shaped rhopalar canals is discussed below.

Further Distribution: Andaman Islands and Mergui Archipelago, Malayan Archipelago, Philippines, Hongkong.

Phyllorhiza punctata (Lendenfeld, 1884)

- Phyllorhiza punctata* Lendenfeld, 1884, pp. 296, 307, pl. 4, fig. 1; pl. 5, figs. 1-4.
Phyllorhiza punctata Stiasny, 1924c, p. 56, figs. 1-4.
Phyllorhiza punctata Stiasny, 1926, p. 255.
Phyllorhiza punctata Stiasny, 1931a, p. 144.

Previous Australian Records: Recorded from near Port Jackson, New South Wales, in all the papers mentioned above.

Material Examined: Cardwell, Queensland, 21.i.55, E. M. Anthony, 5 specimens, diam. 19, 25, 29, 30 and 45 mm. Darwin Wharf, Cairns, 25.xi.60, Bert Cummings, 1 specimen, diam. 27 mm. Esplanade, Cairns, 30.i.61, J. H. Barnes, 2 specimens, diam. 40 and 60 mm. Cairns Inlet, Queensland, 23.xi.61, 2 specimens, diam. 37 and 42 mm. Cairns, No. 2 Wharf, 13.xii.61, 1 specimen, diam. 110 mm. Cairns Inlet, Queensland, 13.xii.61, coll. J. H. Barnes, 3 specimens, diam. 20, 30 and 45 mm. Cairns Inlet, Queensland, 13.xii.61, coll. G. Rowell, 1

specimen, diam. 45 mm. Cairns Inlet, Queensland, 24.xii.61, 1 specimen, diam. 40 mm. Green Island, Cairns, Queensland, 20.xii.58, 1 specimen, diam. 30 mm. (see remarks below), coll. J. H. Barnes. Urquhart Point, Weipa, Queensland, 2.xi.61, coll. G. Webster, 2 specimens, diam. 45 and 55 mm. Swan River, Western Australia, presumably summer 1957-8, coll. F. Barrett-Lennard, 6 specimens, diam. 20-55 mm.

The genus *Phyllorhiza* has had a somewhat complicated history. The name was introduced by L. Agassiz (1862, p. 158) for a Chinese medusa, *P. chinensis*. Haeckel (1880, p. 588) added a new species, *P. trifolium*, and Lendenfeld (1884) described *P. punctata* from New South Wales, Australia. Mayer (1910, p. 684) regarded the two first species as doubtful, but retained the generic name and placed *P. punctata* as the type species. Later on two more species were described, *P. luzoni* Mayer (1915) from the Philippines (by Stiasny, 1921 and 1924c regarded as doubtful) and *Cotylorhizoides pacifica* Light, 1921; this latter species was referred to *Phyllorhiza* by Stiasny (1924c, p. 50).

Stiasny (1924c, p. 56, figs. 1-4) has examined new specimens from Port Jackson, New South Wales, and given a new, detailed description and also (p. 65) a new diagnosis of the genus *Phyllorhiza*. Additional specimens from Port Jackson were recorded by Stiasny (1926, p. 255), and finally he has examined Lendenfeld's type-specimens (1931a, p. 144).

Though the diagnosis of the genus *Phyllorhiza* seems to me to be rather vague, almost equal to *Mastigias*, I think it advisable to retain the name of *Phyllorhiza punctata* for Lendenfeld's medusa which, evidently, is a very common species in Australian waters not merely on the coasts of New South Wales, whence all previous records are derived, but also around Queensland and in Western Australia, as seen from the present collection.

As a matter of fact, when I first examined these numerous specimens I thought that they belonged to *Mastigias* and in many details they agreed with *M. andersoni*, which was described by Stiasny (1926, p. 252, fig. 3) from five specimens collected at Bowen Harbour, Port Denison, Queensland, and one from Observation Island, Gulf of Carpentaria. I am inclined to think that all these specimens really belonged to *Phyllorhiza punctata*, and the same may possibly also apply to the Australian specimens (from the Great Barrier Reef) of *Mastigias albipunctata* Stiasny, 1920, a species otherwise occurring in the Malayan Archipelago.

Phyllorhiza punctata resembles *Mastigias ocellatus* in the configuration of the radial rhopalar canals, which are broad: the periradial rhopalar canals are bottle-shaped and without anastomoses to the intracircular mesh work of canals, there are numerous "canal roots"; but the terminal appendages of the mouth-arms are usually very long, frequently as long as the diameter of the umbrella or more (also seen in some of the present specimens). The number of marginal lappets in each octant is almost regularly 6, the two median ones being broader than the others and with a median cleft: the same is emphasized in the description of *Mastigias andersoni*.

In the present collection is also a specimen of *Phyllorhiza punctata* from Huai Hin, Thailand (12°56'N., 100°02'E.), collected 15.iv.58 by W. J. S. Thompson: it is 50 mm wide. A medusa, recorded from southern Japan by Uchida (1954, pp. 211, 216) as *Phyllorhiza triformis* Haeckel (1880) may possibly belong to *P. punctata*. Dr. J. H. Barnes says of the specimen collected at Green Island, Cairns, 20.xii.58. "... Captured near the surface in 8 feet (about 2½ metres) of clear water over a sandy bottom; near Green Island jetty. Tide low and

rising, wind light north-west, raising small ripples only. Hot, bright, cloudless day. Colour before preservation, umbrella brown with blue circular spots; mouth-arms milky; appendage (club) from mouth-arms colourless with blue extremity."

Further Distribution: Gulf of Siam; ? southern Japan.

Pseudorhiza haeckeli (Haacke, 1884)

Pseudorhiza haeckeli Haacke, 1884, p. 291.

Monorhiza haeckelii Haacke, 1886, p. 614, pl. 37, figs. 1-9.

Pseudorhiza haeckelii Mayer, 1910, p. 683.

Pseudorhiza haeckelii Stiasny, 1921, p. 123.

Pseudorhiza haeckeli Thiel, 1926, p. 223, pl. 3.

Pseudorhiza haeckeli Stiasny, 1931a, pp. 149, 153.

Pseudorhiza haeckeli Kramp, 1961b, p. 367.

Previous Australian Records: Haacke, 1884 and 1886, St. Vincent Gulf, South Australia. Thiel, 1926, south-west Australia.

Material Examined:

- (1) Port Lincoln, South Australia, 1.iii.59. Coll. F. J. Mitchell and T. D. Scott. 1 specimen, diam. 22 cm. (see remarks below).
- (2) Somerton, S.A., on shore, 15.i.62. Coll. R. V. and Miss J. E. Southcott. One large specimen, fragmentary, determination uncertain (see remarks below).
- (3) Off Marino Rocks, South Australia, 26.i.61, 50-300 yards from shore. Coll. Miss R. M. Arnott Rogers. 12 specimens, diam. 1-2-8-5 cm.
- (4) Brighton, St. Vincent Gulf, S.A., 8.vi.57. Coll. R. V. Southcott. 1 specimen, large, fragmentary, according to notes 11-12 inches (28-30 cm.) (see remarks below).
- (5) Port Noarlunga Reef, S.A., 8.i.61, at surface. Coll. D. Cooper, 2 specimens, diam. 1.5 and 3 cm.
- (6) Aldinga Reef, South Australia, 12.ii.61. Coll. Underwater Research Group. 2 specimens, diam. 10 and 14 cm. (see remarks below).
- (7) Arnhem Land, Northern Territory, Sept., 1961. Coll. V. Wells. 1 specimen, diam. 6 cm.

The genus *Pseudorhiza* was erected by Lendenfeld (1882b, p. 380; 1884, p. 293, pl. 3) for a medusa, *Pseudorhiza aurosa* n. gen., n. sp., collected near Port Philip (Victoria) and near Adelaide (South Australia), and never observed again; the description is insufficient and the figure probably misleading. As it was found in the same area where *P. haeckeli* Haacke occurs in considerable numbers, it seems reasonable to presume that the two species are identical, but the identity can never be ascertained with certainty. Stiasny (1931a) has examined the type-specimen of *P. aurosa* (from Port Philip), which was in poor condition and did not solve the question of the presumed identity of the two species. It seems to me advisable, therefore, to retain the name of *P. haeckeli* for the medusa, which was thoroughly described and elaborately figured by Haacke (1884 and 1886). Later on, several details were described by Thiel (1926), who examined some specimens from three localities between Fremantle and Bunbury on the west coast of Australia.

The principal difference between the two species is the absence of filaments on the mouth-arms of *P. aurosa* in contradistinction to *P. haeckeli*, in which, moreover, one of the mouth-arms (and only one) carries one enormously long and stout appendage near its outer end: it is triangular in cross-section and frequently longer than the diameter of the umbrella. It is present even in young specimens and nearly always retained after preservation; among 18 specimens in the present collection the appendix is lost in only three. Its length is variable as seen from the adjacent table:—

Diam. of umbrella mm.	Length of appendage in <i>Pseudorhiza haeckeli</i> , mm.										
	10	15	20	25	30	40	50	60	70	80	90
15	1	1	1								
20		1									
25						1					
30				1							
45	1			1							
60								1		1	1
80											
100									1		
140									1		
220											1

Haacke (1886, pp. 624 ff) gave a detailed description of young stages of this medusa. Examination of young specimens, 15-25 mm. wide, in the present collection shows that his description is perfectly correct in almost all respects. I shall make only a few additional remarks. The appearance of the exumbrella is very similar to Haacke's fig. 7 (pl. 37), except that in the central area the nematocyst warts are not arranged in definite circles. In a specimen only 11 mm wide, Haacke found only four rhopalia; the present individuals all have eight. In the smallest specimen, 15 mm wide, the mouth-arms are very similar to those in Haacke's fig. 6, though their edges are not perfectly smooth but already slightly frilled to some extent, and this is further developed in the slightly larger specimens: it is remarkable, however, that in these specimens the arm carrying the large appendage and its neighbours on either side are more densely frilled than those on the opposite side. Gastral filaments are short and very numerous in these young stages; gonads are hardly distinguishable. The number of centripetal canals arising from the ring-canal is usually nine in each octant, rarely ten or eleven: they are straight and undivided and all of equal length; in the youngest stage, 11 mm wide, Haacke found 4-5 centripetal canals, the median one longer than the others. As seen from the above table the large appendage on one of the mouth-arms may be longer than the diameter of the umbrella even in small specimens.

Remarks on Occurrence and Colours:

Re (1), Port Lincoln, 1.iii.59. ". . . Apparently this species does not occur far up Spencer Gulf . . ." "The jelly (mesogloea) is blue, the mouth-arms are translucent white, the surface of the bell carries a red reticular pattern."

Re (2), Somerton, 15.i.62. "Cast up on shore. In damaged condition, inactive; clear jelly with purple markings. There was no stinging effect on being handled."

Re (4), Brighton, 8.vi.57. "Bell about 11-12 inches across and jelly substance about an inch thick. The bell was patterned with a purplish-red reticular marking, somewhat hexagonal, and other streaks of this colour led away from it. The medusa broke up when I picked it up in my hands off the sand."

Re (6), Aldinga Reef, 12.ii.61. "The smaller of these two specimens had about 12 small jellyfish sheltering under the mantle. These were dispersed during efforts to guide the Scyphomedusan into a plastic bag, but several were subsequently captured . . ." (see below, *Eirene meunoni*).

Distribution: *Pseudorhiza haeckelii* is evidently a very common jellyfish on the coasts of South Australia, but a specimen was also taken at Arnhem Land on the north coast, and it is recorded from three localities, Rottneest Island, Cockburn Sound, and Koombana Bay, between Fremantle and Bunbury on the west coast. It is known only from Australian waters.

Acromitoides purpurus (Mayer, 1910)

Catostylus purpurus Mayer, 1910, p. 671, fig. 412.

Acromitoides purpurus Stiasny, 1921, p. 136.

Acromitoides purpurus Stiasny, 1924b, p. 39, fig. 1.

Catostylus purpurus Southcott, 1963b, p. 57.

Material Examined: Normanton River, Gulf of Carpentaria, Queensland, 16.v.60, coll. P. F. Aitken, 4 specimens, diam. 12, 14, 16 and 18 cm. (see remarks below). Esplanade, Cairns, Queensland, 21.ii.59, coll. E. Coster, 1 specimen, diam. 5 cm.

The genus *Acromitoides* differs from *Catostylus* in the intracircular anastomosing network being in direct communication with the ring canal and the inter-rhopalar canals only, while in *Catostylus* it communicates with the rhopalar canals as well.

Remarks on the specimens from Normanton River, 16.v.60: "Mr. Aitken reports that these jellyfish were present in large numbers in the incoming tide; they were collected by dip-net from a boat. Colour varied from shades of light pink through light purple and light blue."

Further Distribution: Philippines: not previously recorded from Australia.

Catostylus mosaicus (Quoy and Gaimard, 1824)

Cupha mosaica Quoy & Gaimard, 1824, p. 569, pl. 85, fig. 3.

Rhizostoma mosaica Huxley, 1849, pp. 422, 432, pl. 38, figs. 26, 27; pl. 39, figs. 28-34.

Catostylus mosaicus L. Agassiz, 1862, p. 152.

Crambessa mosaica Haeckel, 1880, p. 622.

Crambessa mosaica Lendenfeld, 1883-1888.

Crambessa mosaica Agassiz & Mayer, 1898, p. 16, pls. 2, 3.

Catostylus mosaicus Mayer, 1910, p. 666.

Catostylus mosaicus Southcott, 1960, p. 21; 1963a, p. 57.

Catostylus mosaicus Kraupp, 1961b, p. 370, all records, 1910-1953.

Previous Australian Records: Quoy & Gaimard, 1824, and Huxley, 1849, Port Jackson, New South Wales. Haeckel, 1880, Lake Illawarra, New South Wales. Lendenfeld, 1887, p. 30, and preceding papers, Port Philip, Victoria. Agassiz and Mayer, 1898, p. 16, near Sydney, New South Wales, and near Brisbane, Cairns and Cooktown, Queensland. Mayer, 1915, p. 190, Moreton Bay, near Brisbane, Queensland. Stiasny, 1922, p. 55-4, Port Hacking, New South Wales.

Stiasny, 1924c, p. 66, Como, near Sydney. Stiasny, 1929, p. 214, Merauke, south coast of New Guinea. Stiasny, 1931b, p. 38, Port Curtis, Queensland. Pope, 1953a, pp. 16-21 (stinging). Southcott, 1960, p. 21 (stinging). Pope, 1963, p. 193 (stinging). Southcott, 1963a, p. 57 (stinging). Thomas, 1963, p. 208.

Material Examined: Clifton Beach, Queensland, 29.xi.61, coll. L. Morrissey, 1 specimen, diam. 17 mm. Esplanade, Cairns, Queensland, 21.ii.59, coll. E. Coster, 2 specimens, diam. 75 and 80 mm. Newell Beach, north Queensland. Dec., 1960-Jan., 1961, coll. Mrs. Betts, 1 specimen, diam. 25 mm.

This seems to be a common Australian medusa, originally described from Australia by Quoy & Gaimard (1824) and later on recorded from several localities from Melbourne northwards along the east coast to north Queensland and from the south coast of New Guinea. It has not been found anywhere else, apart from a record from the Philippines which (Mayer, 1917, p. 215) is regarded as uncertain by the author himself. Several Australian specimens have been examined by Stiasny (1921-1931); the present specimens fully agree with the descriptions given by this prominent expert on Rhizostomeae, and we may safely accept *C. mosaicus* as a valid species.

Distribution: Australia; ? Philippines.

LEPTOMEDUSAE

Eirene menoni (Kramp, 1953)

Phortis sp. Menon, 1932, p. 18.

Phortis lactea Ling, 1937, p. 357, figs. 9-10.

Eirene menoni Kramp, 1953, p. 286, pl. 2, fig. 6.

Previous Australian Records: Kramp, 1953, p. 286. Great Barrier Reef. Kramp, 1965 (in press). Near Sydney.

Material Examined: Aldinga Reef, South Australia, 2 miles off-shore, surface. 12.ii.61. Coll. Underwater Research Group, South Australia. 4 specimens.

The specimens are 13-17 mm. in diameter and have the following numbers of marginal tentacles:

diam., mm.	13	15	16	17
tentacles	44	ca. 44	ca. 40	ca. 54

The length of the gonads is very variable in this species; in the present specimens they extend from very near the ring-canal to more than half the distance upwards towards the base of the peduncle. The tentacles are all of almost equal length, without any young ones between the others.

Further Distribution: S.E. Africa; India; Macassar Strait to Chekiang Coast in China; Cook Islands in Polynesia.

Helgicirra danduensis (Bigelow, 1904)

(Fig. 3)

Eirene danduensis Bigelow, 1904, p. 254, pl. 1, fig. 5; pl. 2, fig. 6

Helgicirra danduensis Kramp, 1936, p. 255.

Helgicirra danduensis Kramp, 1961b, p. 192.

Not previously recorded from Australia.

Material Examined: Lameroo Beach, Darwin, Northern Territory, 17.vi.62. Coll. R. V. Southcott. 1 specimen, diam. 5 mm., netted between surface and 0.5 m. depth, at 0-10 m. from shore.

This is one of the two Indo-West Pacific species of *Helgicirrha*, and it is distinguished from *H. malayensis* (which occurs on the Great Barrier Reef) by its very short oral lips, more elongated stomach, and by the greater distance between the tentacles. Direct comparison with specimens of both species from other localities has convinced me of the identity of the present specimen with *H. danduenis*. It is 5 mm. in diameter (thus in a rather young stage, since the medusa may obtain a size of 25 mm.). The peduncle is 2 mm. long, conical in its basal part, distal part cylindrical; the gonads are narrow, linear, extending from the base of the peduncle three-fifths outwards towards the bell margin. There are 32 tentacles, each with one pair of lateral cirri; between the tentacles there are two or three very small papillae and usually one marginal vesicle. As in most other specimens of *H. danduenis* examined by me on former occasions, the stomach is not particularly elongated, but the gastric tissue is continued somewhat up above the terminal constriction of the peduncle (Fig. 3). I cannot refer this specimen to the same species, *H. malayensis*, of which I have examined numerous specimens from the Great Barrier Reef (Kramp, 1953, p. 286) and from the Mergui Archipelago (Kramp, 1958, p. 355); it certainly belongs to *Helgicirrha danduenis*.

Further Distribution: Maldive Islands; Nicobar Islands; a doubtful record from Vietnam.

Phialopsis diegensis (Torrey, 1909)

Phialopsis diegensis Torrey, 1909, p. 23, fig. 9.

Phialopsis diegensis Kramp, 1961b, p. 193 (all references).

No previous records from Australia.

Material Examined: One mile north-east of northernmost point of Torrens Island, South Australia, from surface to depth of 3 feet, 29.iv.61, coll. P. D. Grogan, 11 specimens; diam. 8-12 mm.

The apical jelly is uncommonly thick and vaulted; most of the marginal cirri are lost, and in most of the specimens the gonads are lost, but where present they are of the structure typical of this species.

Further Distribution: Mainly oceanic. Common in the Atlantic Ocean, mainly in its eastern parts, from the Irminger Sea to the Cape of Good Hope; off the east coast of Africa; California and south-west of the Galapagos Islands in the eastern Pacific. The occurrence in South Australia bridges the gap between the east Pacific and the western part of the Indian Ocean.

LIMNOMEDUSAE

Olindias singularis (Browne, 1905)

Olindias singularis Browne, 1905, p. 737, pl. 56, fig. 2; pl. 57, fig. 1.

Olindias singularis Bigelow, 1909, p. 109, pl. 4, fig. 1; pl. 31, figs. 1-10; pl. 32, fig. 8.

Olindias singularis Kramp, 1953, p. 298.

Olindias singularis Kramp, 1956, p. 237.

Olindias singularis Kramp, 1958, p. 366.

Olindias singularis Southcott, 1963b, p. 20, fig. 3B.